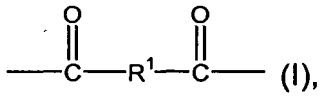
CLAIMS

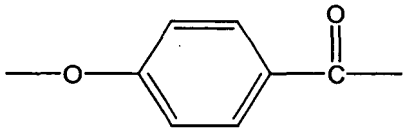
What is claimed is:

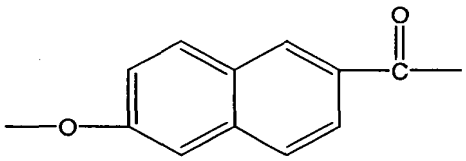
1. A liquid crystalline polymer comprising repeat units of the formulae


(I),

-O-R^2-O- (II),

-O-R^4-O- (V),


(IIIA), and


(IIIB),

wherein:

each R^1 is independently hydrocarbylene or substituted hydrocarbylene;

each R^2 is independently saturated hydrocarbylene or substituted saturated hydrocarbylene;

each R^4 is independently arylene or substituted arylene;

(V) is about 0.4 to about 32 mole percent of the total of (I) present;

the molar ratio of (I):[(II)+(V)] is about 1.0:1.0;

the molar ratio of (I):[(IIIA)+(IIIB)] is about 1.0:1.0 to about 1.0:4.0; and

the molar ratio of (IIIA):(IIIB) is about 5:1 to about 1:2.

2. The liquid crystalline polymer of Claim 1 wherein

from 90 to 100 mole percent of R^1 is *p*-phenylene, and from 0 to 10 mole percent of R^1 is *m*-phenylene;

from 90.0 to 100 mole percent of R^2 is -CH_2CH_2- and from 0 to 10.0 mole percent of R^2 is -$CH_2CH_2OCH_2CH_2$-;

each R^4 is 4,4'-biphenylene;

(V) is from about 1 to about 3 mole percent of the total of (I) present;

the molar ratio of (I):[(II)+(V)] is about 1.0:1.0; and the total amount of the repeat unit (I+V) plus the repeat unit (I+II) is from about 25 to about 35 mole percent of said liquid crystalline polymer;

the amount of (IIIA) is from about 45 to about 55 mole percent of said liquid crystalline polymer; and

the amount of (IIIB) is from about 15 to about 25 mole percent of said liquid crystalline polymer.

3. The liquid crystalline polymer of Claim 1 wherein

the total amount of the repeat unit (I+V) plus the repeat unit (I+II) is from about 28 to about 32 mole percent of said liquid crystalline polymer;

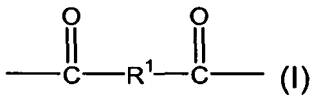
the amount of (IIIA) is from about 48 to about 52 mole percent of said liquid crystalline polymer; and

the amount of (IIIB) is from about 18 to about 22 mole percent of said liquid crystalline polymer.

4. The liquid crystalline polymer of claim 1 which has been treated with a monomeric functional compound to reduce its melt viscosity at a shear rate of 1000 sec^{-1} by at least 10%.

5. A process for the manufacture of a liquid crystalline polymer comprising:

(a) contacting, in the absence of added solvent, a partially aromatic polyester, having repeat units of the formula



(I)

and

$$-O-R^2-O- \quad (II),$$

with one or more compounds of the formula $HO-R^3-CO_2H$ (III), one or more compounds of the formula $HO-R^4-OH$ (IV), and a carboxylic acid anhydride, under conditions to form esters of (III) and (IV) by reaction with said carboxylic acid anhydride, and

(b) heating the mixture resulting from (a) at a temperature and for a

sufficient amount of time to form a liquid crystalline polymer wherein

each R^1 is independently hydrocarbylene or substituted hydrocarbylene;

each R^2 is independently alkylene or substituted alkylene;

each R^3 is independently arylene or substituted arylene; and

each R^4 is independently arylene or substituted arylene;

and provided that (IV) is present in an amount, based on the amount of (II) present in said partially aromatic polyester, to achieve a total diol stoichiometric excess of 0.5 to 15 mole percent.

6. The process of claim 5 wherein said carboxylic anhydride is acetic anhydride.

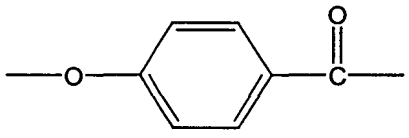
7. The process of claim 6 wherein:

from 90 to 100 mole percent of R^1 is *p*-phenylene, and from 0 to 10 mole percent of R^1 is *m*-phenylene;

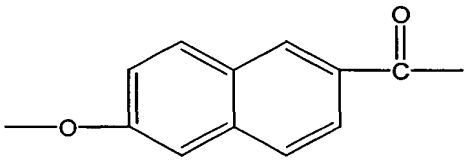
from 90.0 to 100 mole percent of R^2 is $-CH_2CH_2-$ and from 0 to 10.0 mole percent of R^2 is $-CH_2CH_2OCH_2CH_2-$;

each R^4 is 4,4'-biphenylene;

(III) is a mixture of



(IIIA), and



(IIIB),

the molar ratio of (I):[(II)+(V)] is about 1.0:1.0;

the molar ratio of (I):[(IIIA)+(IIIB)] is about 1.0:1.0 to about 1.0:4.0; and

the molar ratio of (IIIA):(IIIB) is about 5:1 to about 1:2; and

the stoichiometric excess is 1 to 3 percent.

8. The product of the process of any one of claims 5, 6 or 7.

9. The process as recited in claim 5 comprising the additional step of treating the liquid crystalline polymer with a monomeric functional compound to

reduce its melt viscosity at a shear rate of 1000 sec^{-1} by at least 10%.

10. A container comprising a liquid crystalline polymer of Claim 1.

11. A container comprising the product of claim 8.

12. The container of Claim 10 that is a pouch or a bag.

13. The container of Claim 10, comprising said liquid crystalline polymer, that is a rigid container selected from the group consisting of a tray, cup, can, bucket, tub, box, pipe, bowl, tube, parison, and carton.

14. The container of Claim 13 that is a carton prepared from paperboard extrusion-coated with said liquid crystalline polymer.

15. The container of Claim 13 that is a thermoformed multilayer layer cup comprising said liquid crystalline polymer as a barrier layer.

16. The container of Claim 15 formed from a multilayer structure comprising exterior layers comprising polypropylene and an inner layer comprising said liquid crystalline polymer, with co-extrudable adhesive layers bonding said polypropylene layers to said liquid crystalline polymer layer.

17. A film or sheet comprising a liquid crystalline polymer of Claim 1.

18. A film or sheet comprising the product of any one of claims 5, 6 or 7.

19. The film of Claim 17 that is a monolayer blown film comprising said liquid crystalline polymer.

20. The film or sheet of Claim 17 that is a multilayer structure comprising at least one layer comprising said liquid crystalline polymer.

21. The film or sheet of Claim 20 wherein said multilayer structure comprises exterior layers comprising polypropylene and an inner layer comprising said liquid crystalline polymer, with co-extrudable adhesive layers bonding said polypropylene layers to said liquid crystalline polymer layer.

22. The film or sheet of Claim 17 bonded, by lamination, extrusion coating or co-extrusion coating, to a substrate selected from the group consisting of paper, paperboard, aluminum foil, fabric, nonwoven material, and a film substrate comprising another polymer selected from the group consisting of

poly(vinylidene fluoride), nylon-6,6, biaxially oriented polypropylene, biaxially oriented poly(ethylene terephthalate), and polyimide.

23. The film or sheet of Claim 22 that comprises Kraft paper extrusion coated with said liquid crystalline polymer.

24. The film or sheet of Claim 22 that comprises paperboard extrusion coated with said liquid crystalline polymer.

25. The container of claim 14 which also comprises a heat seal wherein said liquid crystalline polymer forms both sides of said heat seal.

26. The film or sheet of claim 20 that shrinks in any direction more than 4% when heated to 90°C.

27. A process for coating paper with a liquid crystalline polymer, comprising, contacting a surface of a paper sheet with a molten sheet of liquid crystalline polymer to form a coated paper sheet, then while said liquid crystalline polymer on said coated paper sheet is still at least partially molten applying pressure by having a surface which contacts said liquid crystalline polymer on coated paper sheet, said surface having a temperature below a solidification temperature of said liquid crystalline polymer and which applies pressure to said liquid crystalline polymer on coated paper sheet to produce a liquid crystalline polymer coated paper sheet wherein said liquid crystalline polymer is solid.

28. The process as recited in claim 27 wherein said liquid crystalline polymer comprises the liquid crystalline polymer of claim 1.

29. The process as recited in claim 27 wherein said apparatus is one or two quench rolls.

30. The product of the process of claim 27.

31. A container comprising the product of claim 30.